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Poa nemoralis, L. Woods, rare. Recorded from Northern Maine.

* *Poa debilis*, Torr. Probably this species, though Dr. Vasey says the plant appears somewhat like *alsodes*, Gray. Deep mossy woods.

Puccinellia maritima, Parl., var. *minor*, Watson. I collected this rare form at Cape Elizabeth, Me., in 1889. Only two plants were found.

Festuca gigantea, Vill. Not rare by roadsides.

Aspidium spinulosum, Swartz. The typical form is common here in deep woods and swamps.

Ophioglossum vulgatum, L. Quite abundant.

* *Lycopodium*. Prof. D. C. Eaton names it, "*L. annotinum*, L., var. *pungens*, Spring, a form with the fertile branches less leafy, and thus imitating *L. clavatum*, L." Knolls in pasture. Very scarce.

Thus it is seen that Maine has an unusually interesting flora, the discoveries in which may be made almost indefinite in extent, and when there have been further explorations, doubtless many things will be found to occur here which have hitherto been overlooked by the busy people of the "Pine Tree State."

I wish here at least to express my thanks for the assistance so kindly rendered me and the encouragement given by four of our most prominent workers, Drs. Sereno Watson and Geo. Vasey, and Professors L. H. Bailey and D. C. Eaton.

ORONO, Me.

Reviews of Foreign Literature.

La Génération sexuée des Gleichéniacées. N. W. P. Rauwenhoff, (Archives Néerlandaises xxiv. 157–231.)

The Gleicheniaceæ form a group of ferns having no representatives within the United States. They are usually placed between the Osmundaceæ and the other leptosporangiate ferns, and constitute a family of equal rank with the Polypodiaceæ, Schizæaceæ etc. They have been but little studied, and the paper before us is the first account of the prothallium that is at all complete, although the author in 1877 and 1879 published some notes upon them.

In the present paper the author treats at considerable length the germination of the spore and the development of the prothallium and sexual organs, and gives a few very brief notes upon the embryo.

The structure of the spores, and the first phases of germination are treated very minutely, and are briefly as follows: The ripe spores are destitute of chlorophyll, of a yellow color, and possessing a membrane that shows a differentiation into three layers, perispore, epispore, and endospore, none of which are composed of unaltered cellulose.

Shortly after sowing the spores chlorophyll is formed, and the spore membrane is ruptured, allowing the enlarging contents to protrude in the form of a papilla, which together with the rest of the spore contents, is now surrounded with a cellulose wall.

The early stages of the prothallum do not differ in any marked degree from those of other Leptosporangiatæ, resembling, perhaps the Osmundaceæ most nearly, especially in the not infrequent formation of a cell-mass as the first stage of the prothallium. The prothallium usually grows for some time by a two-sided apical cell, which is later replaced by a row of equal marginal initials, as in other ferns. Sometimes, as in the Osmundaceæ, a thickened midrib is formed very early, but usually the thickening is confined to the cushion back of the notch in front, as in the Polypodiaceæ. A tendency to form numerous lateral branches, capable of independent growth, and a multiplication of the prothallia by this means, is shared with the Osmundaceæ.

The development of the sexual organs, especially the archegonium, is not treated with as much care as could be wished. The antheridia, in their development, are midway between the Osmundaceæ and Polypodiaceæ but one or two statements made require confirmation. This is especially true of the statement that chlorophyll is found in the central cell of the young antheridium, as well as in the peripheral cells. This is certainly contrary to what obtains in all other investigated archegoniates, and as figure 58 of the memoir in which this is shown evidently represents a pathological case, as is evident from the collapsed condition of the central cell, the statement is probably incorrect. The account of the spermatozoids is also very confused, and the impression is given that their whole development takes place after the escape of the sperm-cells from the antheridium, which, to say the least, is improbable. At any rate, no account is given of their origin and development beyond a very brief statement of the changes in the appearance of the sperm-cells from the time they are ejected to the escape of the spermatozoids, a period varying from one-quarter to one-half hour.

The development of the archegonium corresponds, so far as the somewhat incomplete account goes, with that of other ferns. The neck, to judge from the figures, as nothing is said in this point in the text, is straight, as in the Osmundaceæ and Hymenophyllaceæ. The number of canal-cells is not given, and no mention is made of a ventral canal-cell, although unquestionably one must be present.

The same vagueness is noticed in his treatment of the embryo. After stating that the first division-wall is slightly inclined to the axis of the archegonium and that the next divisions result in the formation of octants, as in the other Filicineæ, he says: " Peu à peu l'embryon devient un corps globuleux, à petites cellules, dans lequel........la cellule triangulaire du sommet de la racine est la première à se différencier nettement."

Sometimes more than one embryo will begin to form upon the same prothallium.

A study of the growth of the root confirms Nägeli and Leitgeb's statements as to the origin of the primary tissues of the root, rather than the recent account of Van Tieghem and Doüliot.

While the paper is a valuable contribution to our knowledge of the ferns, it would have been quite as much so if a large part of the very tedious introductory matter were omitted; and it is much to be regretted that the account of the sexual organs and the embryo is not more careful and complete, as a comparison of these with other ferns might be of great value from a systematic standpoint. DOUGLAS H. CAMPBELL.

Assimilation of the Free Nitrogen of the Air by Leguminous Plants. In the Berichte der deutschen Bot. Gesellschaft of November last, Dr. Frank gives the result of an experiment on *Robinia Pseudacacia.* The soil for this purpose was pure quartz sand, first heated, then washed with water containing hydrochloric acid, then with pure water. To this was added a solution of nourishing material of a certain known composition, afterward the pots holding this prepared soil were placed in a steam sterilizer and heated for several hours. A slight quantity of soil, taken from the earth where *Robinia* trees grew under ordinary conditions, was then placed in each pot. This was to supply the young plants with germs of the supposed bacteria. Seeds were then sown, a single one in each pot, and the resulting plants kept in the hot-house and watered with distilled water. After the growth of a single summer the plants were examined and subjected to chemical analysis. All had developed the little tubers supposed to be caused by bacteria, and there were found in different conditions, some entirely emptied of contents, others yet tense, and hard with all intermediate stages. The chemical analysis showed the quantity of nitrogen contained in the plants to be something more than thirty-eight times that contained in the seeds. This nitrogen could have been obtained from no other source, it is claimed, than the free nitrogen of the air. In order to show more clearly the function of the tubers and their connection with the bacteria germs, a few pots were prepared without the earth from outside, but allowed to stand in the same room with the others. These plants also developed tubers, though less in number and less well developed, which Dr. Frank says could have come from no other source than the germs escaped from the other pots. Various precautions were taken to avoid this infection, such as covering the surface with cotton, etc., but the simpler method of removing the pots from the atmosphere surrounding the infected plants seem not to have been tried.

E. L. G.

Recherches sur la Vrille des Passiflores, par M. W. Russell. (Bull. Soc. Bot. de France, xxxvii. 189-192).

The rameal nature of the tendrils of the Passifloræ is well known, but their origin is a source of considerable discussion among botanists. According to various authors there exists in the axils of the leaves two or three organs, of which one represents the axillary branch, whereas the others are either accessory ramifications, or normal ramifications of the same or of a different order.

In this study of the tendrils of the Passifloræ, the author takes *Passiflora holosericea* as a type and observes—1st, a tendril it the axil of the leaf; 2nd, two floral pedicels *b* and *c* on either side of the tendril, but slightly behind it; 3rd, a leaf-bearing branch, and *a* situated between the tendril and the stem. Of all these organs the first to develop is the tendril, and when that has attained a certain size, a second bud appears in the angle of the tendril and the stem, which bud developes into the leaf bearing branch *a* and after that are formed successively the buds *b* and *c*, one at the right and the other to the left of the base of the tendril. It is to be noted that neither of these three buds possesses an axillary leaf, or even a rudimentary one.

The conclusions reached are that the tendril of the Passifloræ represents a modified axillary branch that can have at its base several secondary branches destitute of axillary leaves. The branch representing the first ramification is always developed, and produces either a branch with leaves which replaces the axillary branch transformed into a tendril, or a flora pedicel, either simple or branched. The other branches that are in the flowering portion of the plant become plural pedicels, or are only partly developed, or remain undeveloped. A. M. V.

Sulle foglie delle Piante acquatiche e specialmente sopra quelle della Nymphœa e del Nuphar. Nota di G. Arcangeli. (Nuovo Giornale Bot. Ital. xxii. 441).

In the above study on the structure of the leaves of *Nymphœa* and *Nuphar* the terms *idrophylli*, *œridrophylli* and *œrophylli* are suggested to designate respectively the submersed, floating and ærial leaves of aquatic plants. Under the group of *idrophylli* Sig. Arcangeli proposes to unite all the leaves that present structures adapted to thrive totally under water as do the leaves of the *Zosteraceœ*, some *Potamogeton*, *Vallisneria*, *Elodea*, etc.; under that of *œridrophylli* all the forms that float on the surface of the water, as in *Nymphœa* and *Nuphar*; and under the name of *œrophylli*, those that grow above the surface of the water, as do the leaves of *Sagittaria* and *Limnobium Spongia*.

A. M. V.

Key to the Genera and Species of British Mosses. Rev. H. G. Jameson. (Journ. Bot. xxix., 33-45, plate 302).

Beginners and students of mosses who do not recognize genera at sight will find this a useful guide, while even more advanced students will appreciate the ingenuity by which the key and its explanation is made to serve as an illustrated glossary. The terms used are as simple as accuracy will allow, and the key permits the analysis of sterile as well as fruiting specimens. The genera of the Hypneæ are separated, thus forcing a beginner to recognize differences which are as clear as those which separate genera of acrocarpous mosses. E. G. B.

Index to Recent Literature relating to American Botany.

Allamanda grandiflora. (Garden, xxxix. 192, 193, Pl. 794).

Anthracnose of Cotton. E. A. Southworth. (Journ. Mycol. vi. 100-105, Pl. iv. and figs. in text).

A new species is described and figured in this article, *Colletotrichium Gossypii*, which was originally distributed in Ellis' North American Fungi, as *Glœosporium carpigenum.*

Anthracnose of the Hollyhock—Additional observations on. E. A. Southworth. (Journ. Mycol. vi. 115, 116).

Reference is made to the apparent fact that this fungus was described in 1854 by Braun and Caspary as *Steirochœte Malvarum*, and the name *Collectobrichium Malvarum*, (Br. and Casp.), must therefore stand for it. The author also notes that *S. graminicola*, (Ces.) Sacc. may be identical with *C. Bromi*, Jennings, an undescribed species on *Bromus secalinus.*

Arbor-vitœ—The Western. (Gard. and For. iv. 109, 110, fig. 23).

A description of *Thuja gigantea*, with illustration of base of the trunk and account of the confusion in its nomenclature with *Libocedrus.*

Aster macrophyllus. (Gard. and For. iv. 88, 89, fig. 18).

Blackberry Rust—Perennial Mycelium of the Fungus of. F. C. Newcombe. (Journ. Mycol. vi. 106, 107, Pl. v, vi).

Description and representation of *Cœoma nitens.*

Black Knot of Plum and Cherry Trees. Byron D. Halstead. (Bull. No. 78, N. J. Agric. Enp. Sta., illustrated).

This is an appeal for the destruction of such trees or parts of trees as may have become infested with this fungus (*Plowrightia*